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CN8240 & CN8260 SERIES

Communications & Options Guide

User's Guide

$\mathsf{C}\,\mathsf{E}$ $_{\mathrm{c}}(\mathrm{UL})_{\mathrm{us}}$

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Table of Contents

For information and instructions related to basic operations, refer to the CN8240/CN8260 operator's manual supplied with your controller.

Option Wiring Diagrams

Guide to Digital Communications

Relay, N.O.
Alarm Output

Option -AL1, -AL2: Relay, N.O. Alarm Output

```
                                    N.O.        2      12
                            -   C           3      13
          OUTPUT 2  {       -   N.O.        4      14
                            +
          Load   5 amp fuse     N.O.        5      15
Supply voltage*                              6      16
                            ALARM 1 {   C
          Load   5 amp fuse     N.O.        7      17
Supply voltage*             ALARM 2 {
                                C           8      18
                            L1              9  21  22  19
          120-250 V                             2       2
          50-60 Hz          L2              0       6
```
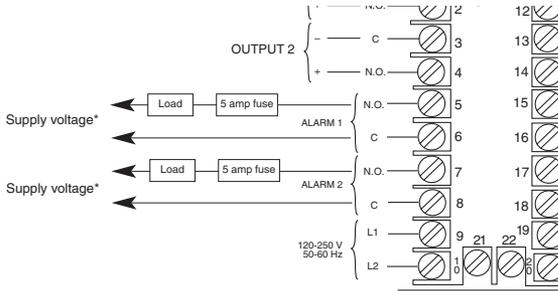
Option Description: NO (Normally open) relay contact is closed when either alarm is active. The relay life is greater than 100,000 operations at 5 operations per second switching full load.

*Connect load and supply voltage per the following table:

Load Type	5 A Voltage Limit
Resistive dc	30 Vdc
Inductive ac (L/R = 7 ms)	20 Vdc
Resistive ac	250 Vac
Inductive ac (pF = 0.4)	150 Vac
Motor, ac, 1/6 hp	250 Vac
Tungsten Lamp, 360 W	120 Vac

RS-232
Communications

Option -C2: RS-232 (one-to-one) Communications

```
        RCV     XMT        SIG GND

         1       1         1
               23     24
         2                 12

         3                 13
```
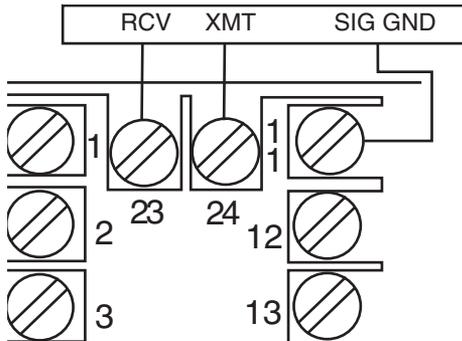
Option Description: Provides a one-to-one connection between the controller and an RS-232 port. Computers, PLCs, or dumb terminals may be used to set and access controller data.

RS-485 Communications

Option -C4: RS-485 (one-to-many) Communications
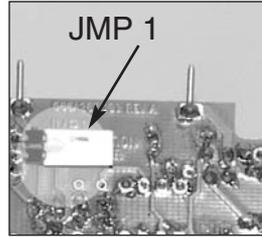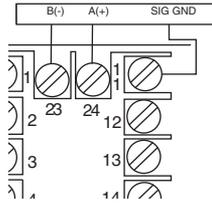
Option Description: Provides one-to-many communications.

Terminate the controller furthest from the computer by either connecting a 120-ohm, 1/4-watt resistor between terminals 23 and 24 or using jumper 1 located on the underside of the communications board as shown above.

Transducer Power Supply

Options -XP1, -XP2, -XP3, -XP4: Transducer Power Supply
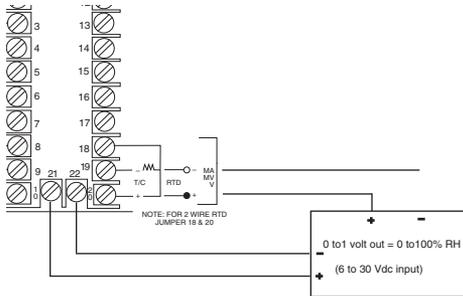
Option Description: The transducer power supply option provides power to remote transducers. The transducer outputs, in turn, provide a signal to the controller input which can be scaled in the appropriate engineering units.

> Option -XP1: 15 Vdc
> Option -XP2: 12 Vdc
> Option -XP3: 10 Vdc
> Option -XP4: 5 Vdc

All options will provide at least 20 mA. The transducer circuitry is thermally protected from short circuits.

Process Output

Options -PVSV1, -PVSV2: Process Output
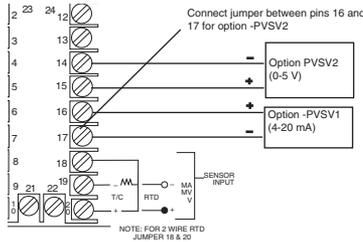
**Option Description:** The Setpoint Variable or Process Variable is transmitted to a remote device (chart recorders, indicators, data recorders, computers, process controllers, etc.) with 1 of 2 different interfaces:

> Option -PVSV1: 4-20 mA
> Option -PVSV2: 0-5 V

The output signal is scalable in the Auxiliary Output Menu. Multiple remote indicators may be driven by the controller.

For current (mA) options, the remote indicators are connected in series. The sum of the input resistance for all remote indicators must be less than 400 ohms. For voltage options, the remote indicators are connected in parallel. The sum of the currents for all remote indicators must be less than 10 mA.

Remote Setpoint Options

Options -DIC, -RSP4, -RSP5, -RSP6, -RSP7: Remote Setpoint

Options -RSP4, -RSP5, -RSP6, -RSP7
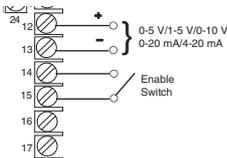
Option -DIC

Remote analog setpoint (voltage/current input)
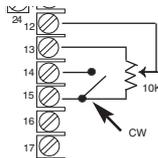
Remote analog setpoint (potentiometer with enable switch)
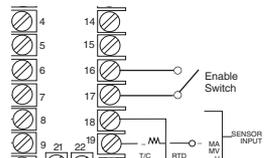
Switch input only

Option Description: Remote setpoints use either voltage or current inputs, depending on the specified option:

> Option -DIC: Switch Input Closed
> Option -RSP4: 0-5 Vdc
> Option -RSP5: 1-5 Vdc
> Option -RSP6: 0-20 mA
> Option -RSP7: 4-20 mA

The input signal is scalable in the Remote Analog Setpoint Menu. Activation of the analog setpoint causes the F1 indicator to illuminate. For current (mA) options, the input resistance is 255 ohms. For voltage input options, the input resistance is greater than 10K ohms. *Note: Switch input option -DIC is active when switch is closed. The digital input option menu* `d.In` *controls the programming of this switch.*

*Ground shield at one end, taking care not to run wires next to power circuitry. Maximum length will be determined by noise performance.

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CN8240/CN8260 Series
Controllers
with
Digital
Communications
Option

Digital
Communications Option

Remote Communications Options

RS-232

This method allows bidirectional data transfer via a three-conductor cable consisting of signal ground, receive input and transmit output. It is recommended for communication distances less than 50 feet between the computer terminal and the instrument. Note: Multiple instruments cannot be connected to the same port.

The RS232 port is optically isolated to eliminate ground loop problems. Typically, "Data Out" of the computer/terminal connects to the "RCV" terminal. "Data In" connects to the "XMT" terminal. If shielded cable is used, it should be connected to the frame ground at one end only. Signal ground is to be connected at appropriate ground terminals (refer to wiring diagram on bottom of this page).

RS-485

The RS485 multipoint capability allows up to 32 controllers to be connected together in a half-duplex network or up to 100 controllers with an appropriate communications repeater.

This method allows bidirectional data transfer over a twisted pair cable. The twisted pair cable is a transmission line; therefore, terminating resistors are required at the most distant ends of the line to minimize reflections (typically 120 ohms at each end). The RS485 circuit is fully optically isolated, eliminating ground loop problems. Parallel drops from the transmission lines should be kept as short as possible; however, the line may be daisy-chained at each controller. The polarity of the line is important and each device will specify an "A" (+) and "B" (-) connection.

Figure 1. Wiring diagram for digital communications.

DIGITAL COMMUNICATIONS
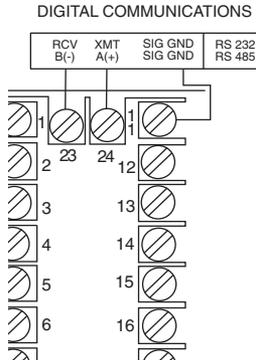
Three remote communications options are available for the CN8240/CN8260 which allow interfacing to remote devices utilizing the most common industry standards: RS232 and RS485.

Call factory for a recommended RS485 converter.

Digital
Communications Option

Omega+ Protocol

The Omega+ Protocol provides an easy way to query and modify controller parameters using a personal computer and the optional digital communications option of the 18C/25C.

In this manual, the word "host" refers to the personal computer that's communicating with the controllers in the serial link, and the word "slave" refers to the controllers themselves.

All transactions between the host and the slaves are done with messages consisting of only printable ASCII characters. There are only two primary types of messages: Requests and Responses. Messages coming from the host are called requests and messages coming from the slaves are called responses.

With the exception of a broadcast request, for every request sent from the host, the slave will send back a response. If a slave does not respond within 100 milliseconds, then the request can be considered lost.

A broadcast request is a request having an ID of '00' (see Message Formats below). It is used to address all slaves on the network. All slaves on the network will perform the actions requested in a broadcast message. However, a response message will not be returned. Therefore, the host can only broadcast Write or Auxiliary Command Requests. All slaves will ignore all Read Broadcast Requests.

Message Formats

All Omega+ messages adhere to the general format of:

[START CHAR][ID][ZONE][TYPE][PARAM][ERROR][DATA][CHKSUM][END CHAR]

START CHAR

This is a single character which designates the start of the message. For a Request message, this character is the ASCII '$' and for a Response message, this character is the ASCII '%'.

ID

This is a two-character ID identifying the receiving controller. Controller IDs go from 1-255 inclusively and all slaves in the network must have unique IDs. The ID number of '00', when used in a request, designates a broadcast message that is used to address all controllers in the network. See the section Request Message for an explanation of the broadcast message.

In order to represent 255 with just two ASCII characters, a number system known as the Message Code Numbering System is used. In this system, the most significant digit is represented with the numbers 0-9 and the letters A-Z and the least significant digit is represented with the numbers 0-9.

The numbers 0-9 have the same values as their decimal counterparts and the letters A-Z have the values of 100 - 50 inclusively in increments of 10.

Example:

Message Code Value	=	Decimal Value
00		0 + 0 = 00
99		90 + 9 = 99
A0		100 + 0 = 100
A2		100 + 2 = 102
B8		110 + 8 = 118
P5		250 + 5 = 255

Zone

This is a two character ID identifying the Zone number in multi-zone capable controllers. For the 18C/25C, this number must be 01.

Digital
Communications Option

Type

This is a single character identifying the type of message. The following table lists the type characters for all messages.

TYPE character	Message Type
R	Read Request or Read Response Returning a Positive Result
r	Read Response Returning a Negative Result
W	Write Positive Value Request and Response
w	Write Negative Value Request and Response
A	Auxiliary Command

For further information, see following sections on the different message types.

PARAM

This is a two character, message specific, parameter ID. For a Read/Write Request or Response message, this ID identifies the controller parameter. For an Auxiliary Command Request or Response message, this ID specifies the command.

ERROR

Code	Description
0	No error.
1	Framing error.
2	Hardware error.
3	Parity error.
4	Bad character in the TYPE field.
5	Bad message. Message cannot be understood.
6	Bad checksum. The checksum received did not match the checksum of the message.
7	Bad zone ID.
8	Bad auxiliary command ID. The auxiliary command is not supported in this controller.
9	Bad parameter ID. The parameter is not supported in this controller.
A	Bad data. Bad representation in the data field or data is out of range.
B	Attempt to write to a read only parameter.
C	Cannot write to a parameter because it's in use.

Digital
Communications Option

Examples of valid numeric representations for a 6 character data field:

Numeric Value	ASCII Representation
3	3.0000
	000003
	003.00
100	100.00
	0100.0
	000100
3.2	003.20
	0003.2

Examples of invalid numeric representations for 6 character data field:
(B represents a blank, or a space, character)

Numeric Value	Bad ASCII Representation	Why?
3	BBBBB3	Leading blanks are not allowed.
	3.0BBBB	Trailing blanks are not allowed.
3.2	-3.20000	'-' is not allowed.

CHKSUM

This is a two character Message Code Numbering System, representing the sum of all the ASCII values of all the characters (excluding the START, CHAR, the END CHAR, and the CHKSM themselves) in the message. The sum is computed using the following formula:

CHKSM = SUM(All Message Characters)%256

% represents the modulus operator.

END CHAR

This is a single character designating the end of the message. For all messages, the character used is <CR>, the carriage return.

Digital
Communications Option

READ COMMAND TO CONTROLLER
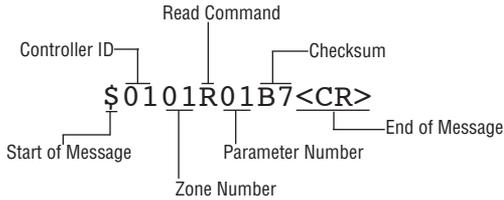
Read Command

Controller ID ──┐   ┌── Checksum

$$\$0101R01B7<CR>$$

Start of Message   Parameter Number   End of Message

Zone Number

READ RESPONSE FROM CONTROLLER

Read Command   Data   Checksum

Controller ID ──┐

$$\%0101R0502.0000J7<CR>$$

Start of Message   Parameter Number

Zone Number   End of Message

WRITE COMMAND TO CONTROLLER

Write Command   Data   Checksum

Controller ID ──┐

$$\$0101W1025.000G7<CR>$$

Start of Message   Parameter Number   End of Message

Zone Number
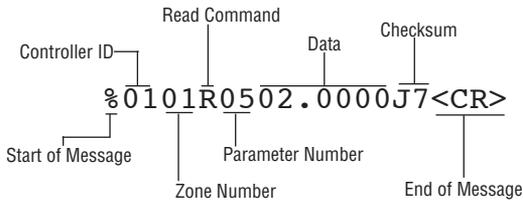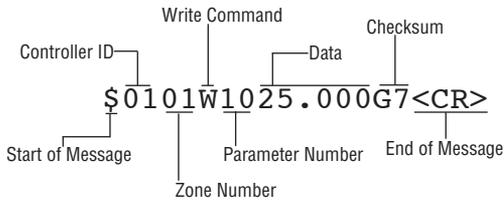
Digital
Communications Option

WRITE RESPONSE FROM CONTROLLER

Write Command

Controller ID

No Error

Checksum

%0101W090H8<CR>

Start of Message

Parameter Number

Zone Number

End of Message
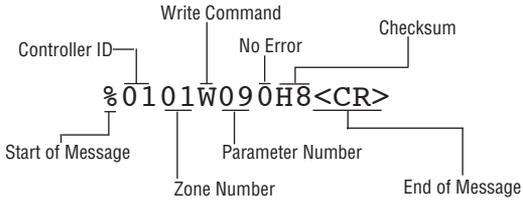
AUXILIARY COMMAND TO CONTROLLER

Auxiliary
Command

Controller ID

Data

Checksum

$0101A020.0000000067<CR>

Start of Message

Parameter Number

End of Message

Zone Number
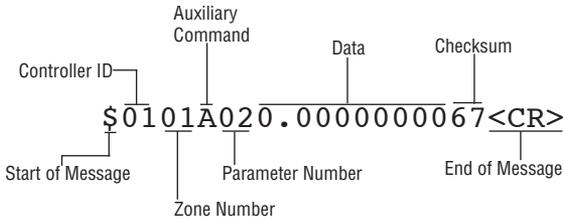
AUXILIARY RESPONSE FROM CONTROLLER

Auxiliary
Command

Controller ID

No Error

Checksum

%0101A020E9<CR>

Start of Message

Parameter Number

Zone Number

End of Message
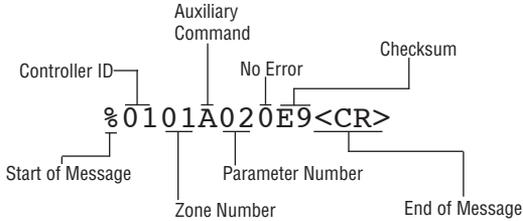
Digital
Communications Option

The Read Request:

The Read Request is used to query parameter values and it has the following message format:
[START CHAR][ID][ZONE][TYPE][PARAM][CHKSUM][END CHAR]

Field Description: TYPE Must contain the uppercase letter 'R'.

Request Message	Description
$Ø1Ø1RØ5C1<CR>	Queries the value of the Process Variable of Controller #1.
$Ø1Ø1RØ9C5<CR>	Queries the value of the EEPROM Setpoint 1 of Controller #1
$Ø2Ø1RØ9C6<CR>	Queries the value of the EEPROM Setpoint 1 of Controller #2.

END CHAR
CHKSUM
PARAM
TYPE
ZONE
ID
START CHAR

Request Messages are sent from the host to the slaves. Each request will have an ID identifying the intended recipient of the request. If the ID is '00' (zero), then the request is a broadcast message.

All slaves will perform the action requested in the broadcast request. However, a response message will not be returned. Therefore, it only makes sense to send Write or Auxiliary Command Requests as broadcast requests.

There are three types of Request Messages: Read, Write, and Auxiliary Commands.

Examples of the responses to these requests are given in later sections on **Response Messages.*

Digital
Communications Option

The Write Request:

The Write Request is used to modify parameter values and it has the following message format: [START CHAR][ID][ZONE] [TYPE][PARAM][DATA][CHKSUM][END CHAR]

Field Description: TYPE   This field must contain one of the following two characters.

        W – Value in DATA is a positive value.
        w – Value in DATA is a negative value.

        DATA   A six-character ASCII representation of a numeric value.

Request Message	Description
$Ø1Ø1WØ91Ø.123G7<CR>	Change both the RAM and EEPROM copies of Setpoint #1 in controller #1 to the value of 10.123
$Ø1Ø1w1Ø1Ø.123J1<CR>	Change only the RAM copy of setpoint #1 in controller #1 to the value of -10.123 (notice the lowercase 'w').

END CHAR
CHKSUM
DATA
PARAM
TYPE
ZONE
ID
START CHAR

Digital
Communications Option

The Auxiliary Command Request:

The Auxiliary Command Request is used to issue commands to the controllers and it has the following message format:

Field Description: TYPE   This field must contain the uppercase letter 'A'

DATA   A ten-character ASCII representation of a numeric value or
10 alphanumeric ASCII characters.

Request Message	Description
$Ø1Ø1AØ1XXXXXXXXXXL2<CR>	Tell controller #1 to load all parameters with their defaults. The 10 X's are padding characters.
$Ø2Ø1AØ2ØØØ1.ØØØØØ69<CR>	Tell controller #2 to perform a low RTD calibration.

END CHAR
CHKSUM
DATA
PARAM
TYPE
ZONE
ID
START CHAR

Response Messages:

Response Messages are replies to the requests sent from the host. For each request received, the slave will reply back with a response.

For all requests, the Omega+ Protocol specifies a maximum response time of 100 milliseconds. If the controller does not start responding within 100 milliseconds after the last request character is received, that request can be considered lost. See Figure 2 below.

There are three types of Response Messages:
Read, Write, and Auxiliary Commands.

Figure 2. Maximum Time Interval Between Host Request and Slave (Controller) Response.

100 ms max.

Request Message   Response Message
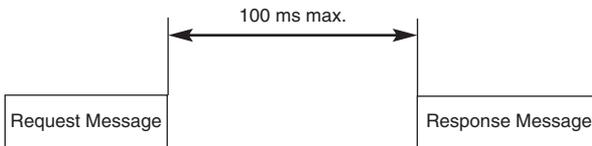
Digital
Communications Option

The Read Response:

The Read Response will be sent in response to a Read Request. Some examples:

Request Message	Description
%Ø1Ø1RØ5Ø21.123K8<CR>	The value of the Process Variable is 21.123 Degrees C.
%Ø2Ø1R1Ø1G7<CR>	A serial transmission has occurred: Framing Error
%Ø1Ø1rØ9Ø21.ØØØN8<CR>	The value of the EEPROM setpoint #1 is -21 Degrees C (notice the lowercase 'r').

END CHAR
CHKSUM
DATA
STATUS
PARAM
TYPE
ZONE
ID
START CHAR

The Write Response:

The Write Response will be sent in response to a Write Request. Some examples:

Request Message	Description
%Ø1Ø1WØ93I1<CR>	A serial transmission error has occurred: Parity error. Write failed.
%Ø1Ø1w1ØØK2<CR>	RAM copy of setpoint #1 modified successfully.

END CHAR
CHKSUM
STATUS
PARAM
TYPE
ZONE
ID
START CHAR

Digital
Communications Option

The Auxiliary Command Response:

The Auxiliary Command Response will be sent in response to an Auxiliary Command Request. Some examples are:

Request Message	Description
%Ø1Ø1AØ1ØXXXXXXXXXXXØ4<CR>	Default load all parameters has started.
%Ø2Ø1AØ2ØØ.ØØØØØØØØB6<CR>	RTD low calibration on controller #2 has started.

END CHAR
CHKSUM
DATA
STATUS
PARAM
TYPE
ZONE
ID
START CHAR

Table 1. Communications Parameter List (Omega+ Protocol)

Number	Name	Read	Write	Data Field Value
1	Controller Type	X	0	3
2	Software Version	X	0	
3	Communications Version	X	0	
4	Status Byte	X	0	This field contains the ASCII representation of an 8-bit value in which the bit assignments are as follows (starting from the least significant bit):

CN8240/CN8260 Parameter Codes

"X"s mark parameters that are supported by the CN8240 and CN8260 and "O"s indicate parameters that are not supported.

X	Process Input Error
X	RAS Error
0	Always Zero
X	Loop Break
X	Alarm 1 Active
X	Alarm 2 Active
0	Always Zero
0	Always Zero

If a bit at a location marked as "X" is set, then the condition is TRUE.
For example, a "48.000" in the data field means that both alarm 1 and alarm 2 are active and everything else is FALSE.

Digital
Communications Option

Table 1. Continued

Number	Name	Read	Write	Data Field Value
5	Process Value	X	0	
6	Operating Mode	X	X	1 - Manual 2 - Standby 3 - Normal (automatic) 4 - Initiate Autotune 5 - Recipe Run 6 - Recipe Hold
7	Access Level	X	X	1 - Lockout 2 - Setpoint 3 - Setpoint Plus 4 - User 5 - Configuration 6 - Factory
8	Contact/Digital Input State	X	0	0 - Switch Open 1 - Switch Closed
9	Setpoint, RAM, EEPROM	X	X	
10	Setpoint, RAM Only	X	X	
11	Second Setpoint, RAM, EEPROM	X	X	
12	Second Setpoint, RAM only	X	X	
13	Remote Analog Setpoint	X	0	
14	Recipe Setpoint	X	0	
16	Output 1 Percentage	X	0	
17	Output 2 Percentage	X	0	
18	Manual Control Output 1 Percentage	X	X	
19	Manual Control Output 2 Percentage	X	X	
20	Output 1 Deadband	X	X	
21	Output 1 Hysteresis	X	X	
22	Output 1 Proportional Band	X	X	
23	Output 2 Proportional Band	X	X	
30	Rate (Derivative) Value	X	X	
32	Reset (Integral) Value	X	X	
34	Manual Reset (Integral) Value	X	X	
37	Output 2 Deadband	X	X	
38	Output 2 Hysteresis	X	X	

Digital
Communications Option

Table 1. Continued

Number	Name	Read	Write	Data Field Value
39	Autotune Damping	X	X	1 - Low 2 - Normal 3 - High
40	Recipe Option	X X X	X X X	0 - Disabled 1 - Single Step 2 - Multi-Step
41	Single-Setpoint Ramp Time	X	X	
42-49	Ramp Times 1-8	X	X	
50-57	Ramp Events 1-8	X	X	0 - Disabled 1 - Event 1 On 2 - Event 1 Off 3 - Event 2 On 4 - Event 2 Off
58-65	Soak Levels 1-8	X	X	
66-73	Soak Times 1-8	X	X	
74-81	Soak Events 1-8	X	X	0 - Disabled 1 - Event 1 On 2 - Event 1 Off 3 - Event 2 On 4 - Event 2 Off
82	Recycle Number	X	X	
83	Holdback Band	X	X	
84	Termination State	X	X	0 - Last Setpoint 1 - Default Setpoint 2 - Recipe to Standby Mode
85	Power Fail Resume Enable	X	X	1 - Resume Off 2 - Resume On
86	Input Bias	X	X	
87	Input Low Scale	X	X	
88	Input High Scale	X	X	
89	Lower Setpoint Limit	X	X	
90	Upper Setpoint Limit	X	X	
91	Input Filter	X	X	

Digital
Communications Option

Table 1. Continued

Number	Name	Read	Write	Data Field Value
92	Input Type	X	X	0 - B Thermocouple
				1 - C Thermocouple
				2 - E Thermocouple
				3 - J Thermocouple
				4 - K Thermocouple
				5 - N Thermocouple
				6 - NNM Thermocouple
				7 - R Thermocouple
				8 - S Thermocouple
				9 - T Thermocouple
				10 - Platinel II Thermocouple
				11 - RTD (Integer)
				12 - RTD (Decimal)
				13 - 0-20 mA
				14 - 4-20 mA
				15 - 0-10 mV
				16 - 0-50 mV
				17 - 0-100 mV
				18 - 10-50 mV
				19 - 0-1 V
				20 - 0-5 V
				21 - 0-10 V
				22 - 1-5 V
94	Output 1 Type	X	X	1 - Inactive/Disabled
				2 - PID
				4 - On/Off
95	Output 1 Action	X	X	1 - Direct
				2 - Reverse

Digital
Communications Option

<p align="center">**Table 1.** Continued</p>

Number	Name	Read	Write	Data Field Value
A2	Output 1 Cycle Time	X	X	
A3	Output 1 Low Limit	X	X	
A4	Output 1 High Limit	X	X	
A5	Output 2 Type	X	X	1 - Inactive/Disabled 2 - PID 4 - On/Off
A6	Output 2 Action	X	X	1 - Direct 2 - Reverse
B3	Output 2 Cycle Time	X	X	
B4	Output 2 Low Limit	X	X	
B5	Output 2 High Limit	X	X	
B6	TC/RTD Decimal Position	X	X	
B7	Linear Decimal Position	X	X	
B8	Display Filter	X	X	
B9	Display Units	X	X	1 - Fahrenheit 2 - Celsius 3 - Kelvin
C1	Display Blanking	X	X	
C2	Alarm 1 Action			1- Off 2 - Normal 3 - Latched 4 - Event
C3	Alarm 1 Operation	X	X	1- Process High 2 - Process Low 3 - Deviation High 4 - Deviation Low 5 - Normal Band 6 - Inverse Band
C4	Alarm 1 Delay	X	X	
C5	Alarm 1 Inhibit	X	X	
C6	Alarm 1 Process Setpoint	X	X	
C7	Alarm 1 Deviation Setpoint	X	X	
C8	Alarm 2 Action	X	X	1 - Off 2 - Normal 3 - Latched 4 - Event
C9	Alarm 2 Operation	X	X	1 - Process High 2 - Process Low 3 - Deviation High 4 - Deviation Low 5 - Normal Band 6 - Inverse Band

Digital
Communications Option

Table 1. Continued

Number	Name	Read	Write	Data Field Value
D0	Alarm 2 Delay	X	X	
D1	Alarm 2 Inhibit	X	X	
D2	Alarm 2 Process Setpoint	X	X	
D3	Alarm 2 Deviation Setpoint	X	X	
D4	Communications Protocol	X	0	1 - Omega +
D5	Communications ID	X	X	
D6	Baud Rate	X	X	0 - 75 1 - 150 2 - 300 3 - 600 4 - 1200 5 - 2400 6 - 4800 7 - 9600
D7	Data Format	X	X	0 - 7-0-1 1 - 7-E-1 2 - 7-N-2 3 - 7-0-2 4 - 7-E-2 5 - 8-N-1 6 - 8-0-1 7 - 8-E-1 8 - 8-N-2
D8	Communications Transmit Delay	X	X	
E1	Output 1 Failsafe %	X	X	
E2	Output 2 Failsafe %	X	X	
E3	Loop Break Time	X	X	
E4	Highest Reading	X	X	
E5	Lowest Reading	X	X	
E8	Option Selection	X	0	1 - Comm Option
E9	TC Zero Calibration	X	X	
F0	TC Span Calibration	X	X	
F1	RTD Zero Calibration	X	X	
F2	RTD Span Calibration	X	X	
F3	Low-Voltage Zero Calibration	X	X	
F4	Low-Voltage Span Calibration	X	X	
F5	High-Voltage Zero Calibration	X	X	

Digital
Communications Option

Table 1. Continued

Number	Name	Read	Write	Data Field Value
F6	High-Voltage Span Calibration	X	X	
F7	Current Zero Calibration	X	X	
F8	Current Span Calibration	X	X	
G1	Auxiliary Output Variable	X	X	
G2	Auxiliary Output Scale Low	X	X	
G3	Auxiliary Output Scale High	X	X	
G5	RAS Scale Low	X	X	
G6	RAS Scale High	X	X	
G7	Contact/Digital Switch	X	X	1 - Disabled 2 - Second Setpoint Select 3 - Standby Select 4 - Run/Hold Switch
H2	Autotune State	X	0	0 - Success 1 - Aborted 2 - Error: No PID Output 3 - Error: No Deviation 4 - Error: No Output 5 - Error: Timed out 6 - Error: Bad Tune 7 - Waiting for PV to settle 8 - Reverse Tune In Progress 9 - Direct Tune In Progress
H3	Recipe State	X	0	
H5	Current Recipe Statement	X	0	
H6	Active Setpoint	X	X	
H7	Resume Exhaustion Flag	X	0	
H8	LED Status Indicator	X	0	
H9	RTD Decimal Zero Calibration	X	X	
I0	RTD Decimal Span Calibration	X	X	
I1	1-5 V, 0-10 V Zero Calibration	X	X	
I2	1-5 V, 0-10 V Span Calibration.	X	X	
I3	10-050 mV, 0-100 mV Zero Calibration	X	X	
I4	10-50 mV, 0-100 mV Span Calibration	X	X	

Digital
Communications Option

Auxiliary Commands:

Command:	**Load Parameter Defaults**
Parameter #:	01
Description	Restore all menu parameters to their default values.
Request Data Field:	Ignored.
Response Data Field:	Ignored.
Command:	**Perform Process Low Calibration**
Parameter #:	02
Description:	Performs a Low Calibration. The data field in the request message specifies the process. Make sure the prerequisite for the calibration is satisfied before issuing a calibration command. For instance, the RTD calibration command must only be used when the input sensor type is chosen as RTD or RTD w/ Decimal.

Digital
Communications Option

Request Data Fields:	A 10-character ASCII representation of a numeric value specifying what to calibrate.
	0 - Thermocouple 1 - RTD, Resistive Thermal Device 2 - Linear 3 - RAS, Remote Analog Setpoint
Response Data Field:	Ignored.
Command:	**Perform Process High Calibration**
Parameter #:	03
Description:	Performs a High Calibration. The data field in the request message specifies the process. Make sure the prerequisite for the calibration is satisfied before issuing a calibration command. For instance, the RTD calibration command must only be used when the input sensor type is chosen as RTD or RTD w/ Decimal.
Request Data Field:	A 10-character ASCII representation of a numeric value specifying what to calibrate.
	0 - Thermocouple 1 - RTD, Resistive Thermal Device 2 - Linear 3 - RAS, Remote Analog Setpoint
Command:	**Retrieve Display**
Parameter #:	05
Description:	Retrieves the string currently displayed on the slave's display. The data field in the request message specifies which display and the data field in the response message contains the string.
Request Data Field:	A 10 character ASCII representation of a numeric value specifying which display to retrieve data from.
	0 - Lower Display 1 - Upper Display
Response Data Field:	The ASCII string.
Command:	**Clear Latched Alarms**
Parameter #:	10
Description:	Clear all latched alarms.
Request Data Field:	Ignored.
Response Data Field:	Ignored.

Notes

Notes

Notes

WARRANTY / DISCLAIMER

OMEGA ENGINEERING, INC. warrants this unit to be free of defects in materials and workmanship for a period of **25 months** from date of purchase. OMEGA's Warranty adds an additional one (1) month grace period to the normal **two (2) year product warranty** to cover handling and shipping time. This ensures that OMEGA's customers receive maximum coverage on each product.

If the unit malfunctions, it must be returned to the factory for evaluation. OMEGA's Customer Service Department will issue an Authorized Return (AR) number immediately upon phone or written request. Upon examination by OMEGA, if the unit is found to be defective it will be repaired or replaced at no charge. OMEGA's WARRANTY does not apply to defects resulting from any action of the purchaser, including but not limited to mishandling, improper interfacing, operation outside of design limits, improper repair, or unauthorized modification. This WARRANTY is VOID if the unit shows evidence of having been tampered with or shows evidence of having been damaged as a result of excessive corrosion; or current, heat, moisture or vibration; improper specification; misapplication; misuse or other operating conditions outside of OMEGA's control. Components which wear are not warranted, including but not limited to contact points, fuses, and triacs.

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CONDITIONS: Equipment sold by OMEGA is not intended to be used, nor shall it be used: (1) as a "Basic Component" under 10 CFR 21 (NRC), used in or with any nuclear installation or activity; or (2) in medical applications or used on humans. Should any Product(s) be used in or with any nuclear installation or activity, medical application, used on humans, or misused in any way, OMEGA assumes no responsibility as set forth in our basic WARRANTY / DISCLAIMER language, and, additionally, purchaser will indemnify OMEGA and hold OMEGA harmless from any liability or damage whatsoever arising out of the use of the Product(s) in such a manner.

RETURN REQUESTS / INQUIRIES

Direct all warranty and repair requests/inquiries to the OMEGA Customer Service Department. BEFORE RETURNING ANY PRODUCT(S) TO OMEGA, PURCHASER MUST OBTAIN AN AUTHORIZED RETURN (AR) NUMBER FROM OMEGA'S CUSTOMER SERVICE DEPARTMENT (IN ORDER TO AVOID PROCESSING DELAYS). The assigned AR number should then be marked on the outside of the return package and on any correspondence.

The purchaser is responsible for shipping charges, freight, insurance and proper packaging to prevent breakage in transit.

FOR **WARRANTY** RETURNS, please have the following information available BEFORE contacting OMEGA:

1. Purchase Order number under which the product was PURCHASED,
2. Model and serial number of the product under warranty, and
3. Repair instructions and/or specific problems relative to the product.

FOR **NON-WARRANTY** REPAIRS, consult OMEGA for current repair charges. Have the following information available BEFORE contacting OMEGA:

1. Purchase Order number to cover the COST of the repair,
2. Model and serial number of the product, and
3. Repair instructions and/or specific problems relative to the product.

OMEGA's policy is to make running changes, not model changes, whenever an improvement is possible. This affords our customers the latest in technology and engineering.

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